IV. B. 24. Radon

a) Background.

Most people are aware that outdoor air pollution can damage their health but may not know that indoor air pollution can also have significant effects. U.S. Environmental Protection Agency (EPA) studies of human exposure to air pollutants indicate that indoor air levels of many pollutants may be 2 to 5 times, and occasionally, more than 100 times higher than outdoor levels. These levels of indoor air pollutants are of particular concern because it is estimated that most people spend as much as 90 percent of their time indoors.

Over the past several decades, our exposure to indoor air pollutants is believed to have increased due to a variety of factors, including the construction of more tightly sealed buildings; reduced ventilation rates to save energy; the use of synthetic building materials and furnishings; and the use of chemically formulated personal care products, pesticides, and household cleaners.

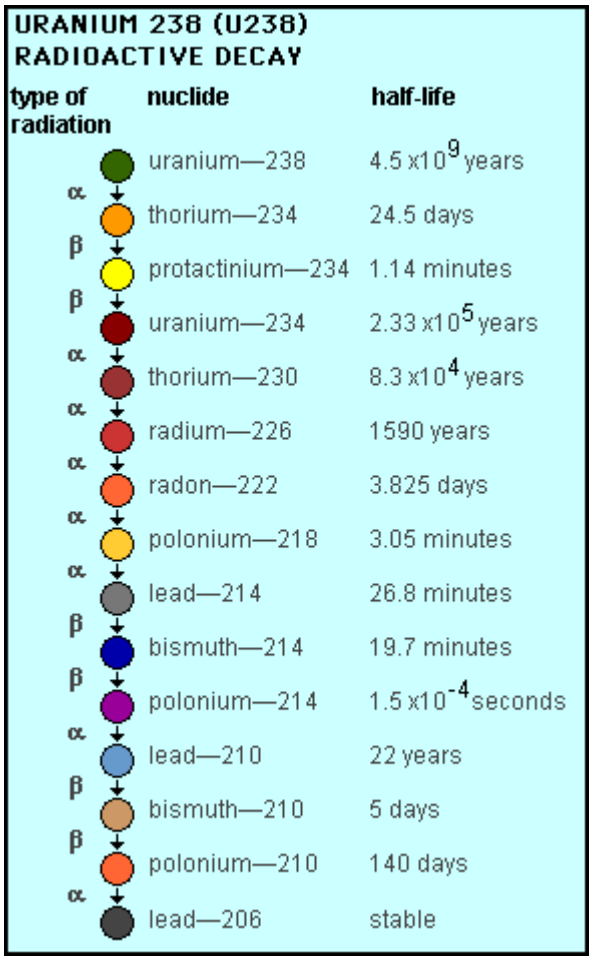
The EPA has, in recent years, performed comparative risk studies and its Science Advisory Board has consistently ranked indoor air pollution among the top five environmental risks to public health. Some of the focuses of the studies have been in the areas of asthma, molds, secondhand smoke, schools,……and radon.

There is no scientific doubt that Radon gas is a known human lung carcinogen. Prolonged exposure to high levels of Radon gas can cause lung cancer. Millions of homes and buildings contain high levels of radon gas. EPA's efforts are directed at locating the homes with high levels and encouraging remediation of them.

EPA and the Office of the Surgeon General recommend that all homes, below the third floor level, be tested for Radon as a means of prevention. A simple test is the only way to determine if a home has high radon levels because Radon is invisible and odorless. EPA recommends mitigating homes found to have high Radon levels and there are straight-forward reduction techniques that are believed to work in virtually any home.

Following are some additional radon facts:

Definition: Radon is a naturally occurring, gaseous, radioactive element having the symbol Rn, the atomic number 86, an atomic weight of 222, a melting point of –71ºC, a boiling point of –62ºC, and 18 radioactive isotopes. It is an extremely toxic, colorless gas. It can be condensed to a transparent liquid and to an opaque, glowing solid. It is derived from the radioactive decay of radium and is used in cancer treatment, as a tracer in leak detection, and in radiography. (It derives its name from the word radium, the substance from which it is derived.).



Radioactive decay to Radon-226

Sources of Radon: Radon emanates from the earth and rock beneath homes, well water, and some building materials.

Health Effects from Exposure to Radon: There are no immediate symptoms. It is estimated to contribute to between 7,000 and 30,000 lung cancer deaths each year. Smokers are at higher risk of developing Radon-induced lung cancer.

Steps to Reduce Exposure to Radon: Test your home for Radon - it's easy and inexpensive. Fix your home if your Radon level is 4 picocuries per liter (pCi/L) or higher. Radon levels of less than 4 pCi/L still pose a risk, and in many cases, can also be reduced.

Radon Levels in Homes: Based on a national residential radon survey completed in 1991, the average indoor radon level is 1.3 picocuries per liter (pCi/L) in the United States. The average outdoor level is about 0.4 pCi/L.

Radon gas can enter buildings through cracks in concrete floors and walls, floor drains, sump pumps, construction joints, and tiny cracks or pores in hollow-block walls. Radon levels are

typically highest in the lowest level of a building. Building design, construction, and ventilation all influence the way radon can be drawn indoors.

b) Governing Regulations.

(a) U.S. Executive Order 11514, Protection and Enhancement of Environmental Quality.

(b) National Environmental Policy Act, 42 U.S.C. 4321.

(c) Title 7, Part 1b and 1c, Code of Federal Regulations, U.S. Department of Agriculture's National Environmental Policy Act.

c) Policy. Some Rural Development applicants and borrowers may become involved with the issue of the presence of radon and may request direction from Rural Development regarding how to deal with it. If so, they should contact the U.S. Environmental Protection Agency Region VIII Office (see "Agency Jurisdiction", below) to obtain the following pamphlet and additional related information:

"EPA Pamphlet, Home Buyer's and Seller's Guide to Radon"

Rural Development Real Estate Owned (REO) Property Dispositions. The presence of radon gas (radon-222) can be feasibly tested for and, if found to be occurring at an elevated concentration, be feasibly mitigated by common technology.

EPA recommends testing all structures intended for habitation for the presence of elevated levels of radon-222 at the time of property exchange. Whenever a Rural Development financed existing dwelling believed to present a viable radon hazard becomes available for sale or transfer, the air within it should be tested to determine if the level of radioactive gas present exceeds 4 pCi/L, if not already accomplished.

Should screening test results (short term) indicate the radon level exceeds 4 pCi/L the property should either be:

(1) Mitigated by a professional contractor experienced in this area, if the property is intended for transfer and the mitigation work is feasible, or

(2) If possible, subjected to long-term, follow-up radon testing to determine the annual average radon-in-air concentrations in the living area. If the annual average radon concentrations exceed 4 pCi/L per long-term testing, the property should either be:

(a) Mitigated by a professional contractor experienced in this area, if the property is intended for transfer and the mitigation work is feasible, or

Active soil gas depressurization system fan (left photo) and roof discharge (right photo) components

(b) Declared not meeting the Decent, Safe, and Sanitary (DSS) standards defined in subparagraph 1955.103 (f) of Rural Development Instruction 1955-C and sold with a written warning to the purchaser containing the following language,

"This property has been tested and found to contain radon gas in air at concentration levels greater than EPA's action level of 4 pCi/L. Living in a home with radon gas levels greater than 4 pCi/L has been shown to cause an increased, but avoidable, risk of lung cancer incidence. The purchaser is cautioned to be aware of this increased health hazard and to exercise appropriate measures, including possible remedial actions, to safeguard human health within the property."

This statement should be placed within the text of a restrictive clause to the Quitclaim Deed.

Additionally, the purchaser should be advised to obtain a copy of the EPA pamphlet mentioned above.

Should test results indicate the radon level does not exceed the 4 pCi/L, no further action regarding radon is necessary other than documenting the test results in the running record.

d) Classification. Not formalized by either the U.S. Environmental Protection Agency (EPA) or the Colorado Department of Public Health and Environment (CDPHE). Only a risk factor is involved.

e) Agency Jurisdiction:

(1) Federal. Consult the following contact:

U.S. Environmental Protection Agency
Region VIII Office
Indoor Air Quality
999 18th. Street
Suite 500
Denver, Colorado 80202-2466

Contact: Megan Williams @ (303) 312-6431

http://www.epa.gov/unix/air/iaq/radon

(2) State. Consult the following contact:

Colorado Department of Public Health and Environment
Radiation Control Division
4300 Cherry Creek Drive South
Denver, Colorado 80246

Contact: Alan Saville @ (303) 692-3184

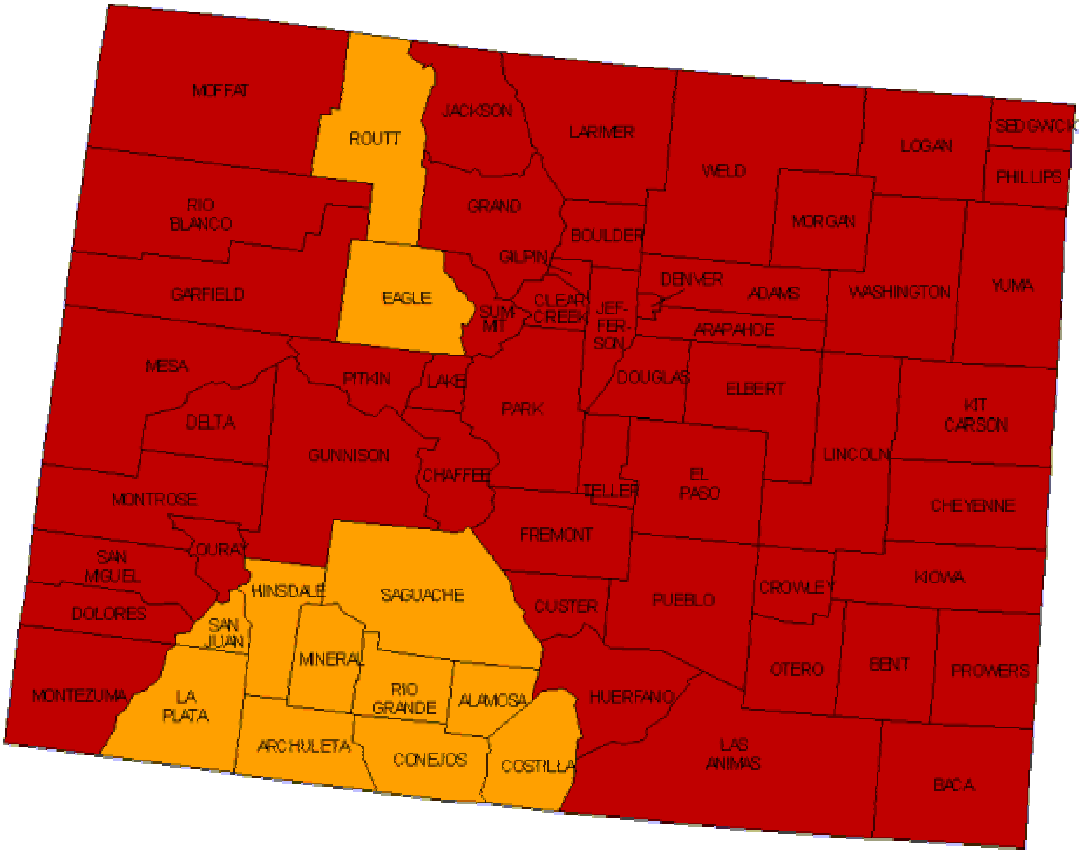
http://www.cdphe.state.co.us

f) Location of Resource. Locational information for radon within the State of Colorado is highly generalized and should certainly not be considered site-specific without individual testing. Consult the U.S. Environmental Protection Agency, Region VIII Office web-site listed below to access U.S. Geological Survey mapping information.

http:/www.epa.gov/iaq/radon/zonemap/zmzpp6.htm

Zone 2 (dark gray): Moderate Potential (from 2 to 4 pCi/L)

Zone 3 (light gray): Low Potential (less than 2 pCi/L)



EPA Radon zone map for the State of Colorado
(Available in color at the above EPA web-site)

g) Other References.

(1) U.S. Environmental Protection Agency. *"Frequently Asked Questions about Radon"*

(Web-site)

http://www.epa.gov/unix0008/air/iaq/radon/radon.html

(2) U.S. Environmental Protection Agency. *"Radon-Specific Indoor Air Quality Publications"*

(Web-site)

http://www.epa.gov/iaq/radon/pubs/index.html

(3) Colorado Department of Public Health and Environment. *"EPA Listed Radon Laboratories, Operators, and Contractors in Colorado"*

(Web-site)

http://www.cdphe.state.co.us/lr/rhepalst.htm

(4) Colorado Department of Public Health and Environment. *"Radon in New Home Construction"*

(Web-site)

http:/www.cdphe.state.co.us/lr/builder.htm

(5) New York State Attorney General. *"Radon: The Invisible Intruder"*

(Web-site)

http:/www.oag.state.ny.us/environment/radon9b.html